

**18NM50-U2**

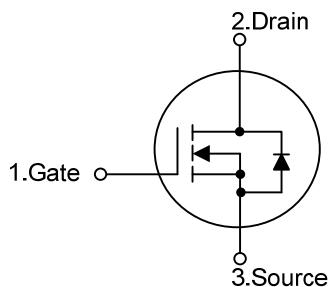
Preliminary

Power MOSFET**18A, 500V N-CHANNEL
SUPER-JUNCTION MOSFET****DESCRIPTION**

The UTC 18NM50-U2 is a Super Junction MOSFET Structure and is designed to have better characteristics, such as fast switching time, low gate charge, low on-state resistance and a high rugged avalanche characteristics. This power MOSFET is usually used at DC-DC, AC-DC converters for power applications.

FEATURES

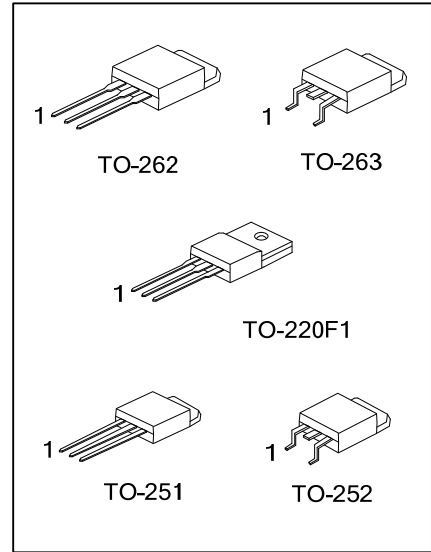
- * $R_{DS(ON)} < 0.28\Omega$ @ $V_{GS}=10V$, $I_D=9.0A$
- * By using Super Junction Structure
- * Fast Switching
- * With 100% Avalanche Tested

SYMBOL**ORDERING INFORMATION**

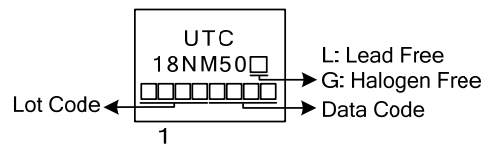
Ordering Number		Package	Pin Assignment			Packing
Lead Free	Halogen Free		1	2	3	
18NM50L-TF1-T	18NM50G-TF1-T	TO-220F1	G	D	S	Tube
18NM50L-TM3-T	18NM50G-TM3-T	TO-251	G	D	S	Tube
18NM50L-TN3-R	18NM50G-TN3-R	TO-252	G	D	S	Tape Reel
18NM50L-T2Q-T	18NM50G-T2Q-T	TO-262	G	D	S	Tube
18NM50L-TQ2-T	18NM50G-TQ2-T	TO-263	G	D	S	Tube
18NM50L-TQ2-R	18NM50G-TQ2-R	TO-263	G	D	S	Tape Reel

Note: Pin Assignment: G: Gate D: Drain S: Source

		(1) T: Tube, R: Tape Reel (2) TF1: TO-220F1, TM3: TO-251, TN3: TO-252, T2Q: TO-262, TQ2: TO-263 (3) L: Lead Free, G: Halogen Free and Lead Free
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■ MARKING



■ **ABSOLUTE MAXIMUM RATINGS** ($T_C = 25^\circ\text{C}$, unless otherwise specified)

PARAMETER		SYMBOL	RATINGS	UNIT
Drain-Source Voltage		V_{DS}	500	V
Gate-Source Voltage		V_{GS}	± 30	V
Drain Current	Continuous	I_D	18	A
	Pulsed (Note 2)	I_{DM}	72	A
Avalanche Current (Note 2)		I_{AR}	3.1	A
Avalanche Energy		E_{AS}	490	mJ
Power Dissipation	TO-220F1	P_D	52	W
	TO-251/TO-252		86	W
	TO-262/TO-263		227	W
Junction Temperature		T_J	+150	$^\circ\text{C}$
Storage Temperature Range		T_{STG}	-55 ~ +150	$^\circ\text{C}$

Notes: 1. Absolute maximum ratings are those values beyond which the device could be permanently damaged.

Absolute maximum ratings are stress ratings only and functional device operation is not implied.

2. Repetitive Rating: Pulse width limited by maximum junction temperature.

3. $L=102\text{mH}$, $I_{AS}=3.1\text{A}$, $V_{DD}=50\text{V}$, $R_G=25\Omega$, Starting $T_J = 25^\circ\text{C}$.

4. $I_{SD} \leq 18\text{A}$, $di/dt \leq 200\text{A}/\mu\text{s}$, $V_{DD} \leq V_{(BR)DS}$, $T_J = 25^\circ\text{C}$.

■ **THERMAL DATA**

PARAMETER		SYMBOL	RATING	UNIT
Junction to Ambient	TO-220F1/TO-262	θ_{JA}	62.5	$^\circ\text{C/W}$
	TO-263			
	TO-251/TO-252		110	$^\circ\text{C/W}$
Junction to Case	TO-220F1	θ_{JC}	2.4	$^\circ\text{C/W}$
	TO-251/TO-252		1.45	$^\circ\text{C/W}$
	TO-262/TO-263		0.55	$^\circ\text{C/W}$

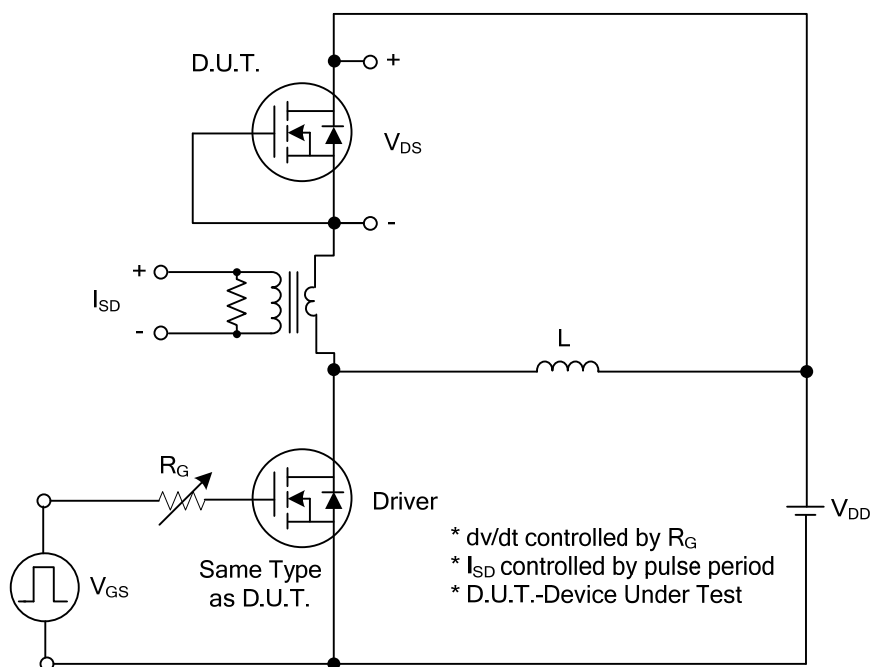
■ **ELECTRICAL CHARACTERISTICS** ($T_J=25^\circ\text{C}$, unless otherwise specified)

PARAMETER	SYMBOL	TEST CONDITIONS	MIN	TYP	MAX	UNIT
OFF CHARACTERISTICS						
Drain-Source Breakdown Voltage	BV_{DSS}	$V_{GS}=0V, I_D=250\mu A$	500			V
Drain-Source Leakage Current	I_{DSS}	$V_{DS}=500V, V_{GS}=0V$			10	μA
Gate-Source Leakage Current	I_{GSS}	$V_{DS}=0V, V_{GS}=\pm 30V$			± 100	nA
ON CHARACTERISTICS						
Gate Threshold Voltage	$V_{GS(TH)}$	$V_{DS}=V_{GS}, I_D=250\mu A$	2.5		4.5	V
Drain-Source On-State Resistance	$R_{DS(ON)}$	$V_{GS}=10V, I_D=9.0A$			0.28	Ω
DYNAMIC PARAMETERS						
Input Capacitance	C_{ISS}	$V_{GS}=0V, V_{DS}=25V, f=1.0MHz$		894		pF
Output Capacitance	C_{OSS}			535		pF
Reverse Transfer Capacitance	C_{RSS}			25.5		pF
SWITCHING PARAMETERS						
Total Gate Charge (Note 1)	Q_G	$V_{DS}=50V, V_{GS}=10V, I_D=1.3A, I_G=100\mu A$ (Note 1, 2)		95		nC
Gate to Source Charge	Q_{GS}			7.3		nC
Gate to Drain Charge	Q_{GD}			28		nC
Turn-ON Delay Time (Note 1)	$t_{D(ON)}$	$V_{DD}=30V, V_{GS}=10V, I_D=0.5A, R_G=25\Omega$ (Note 1, 2)		64		ns
Rise Time	t_R			125		ns
Turn-OFF Delay Time	$t_{D(OFF)}$			238		ns
Fall-Time	t_F			134		ns
SOURCE- DRAIN DIODE RATINGS AND CHARACTERISTICS						
Maximum Body-Diode Continuous Current	I_S				18	A
Maximum Body-Diode Pulsed Current	I_{SM}				72	A
Drain-Source Diode Forward Voltage (Note 1)	V_{SD}	$I_S=18A, V_{GS}=0V$			1.4	V
Body Diode Reverse Recovery Time (Note 1)	t_{rr}	$I_S=18A, V_{GS}=0V,$		385		ns
Body Diode Reverse Recovery Charge	Q_{rr}	$dl_F/dt=100A/\mu s$		5.79		μC

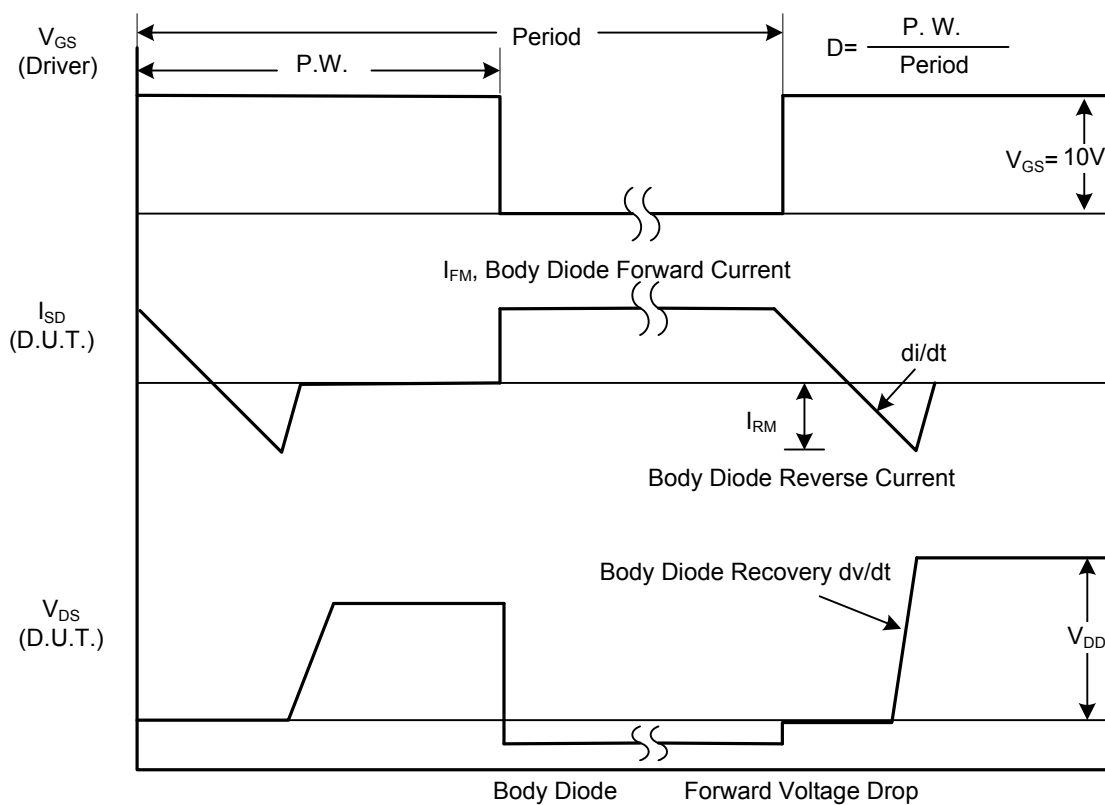
Notes: 1. Pulse Test : Pulse width $\leq 300\mu s$, Duty cycle $\leq 2\%$.

2. Essentially independent of operating temperature.

■ TEST CIRCUITS AND WAVEFORMS

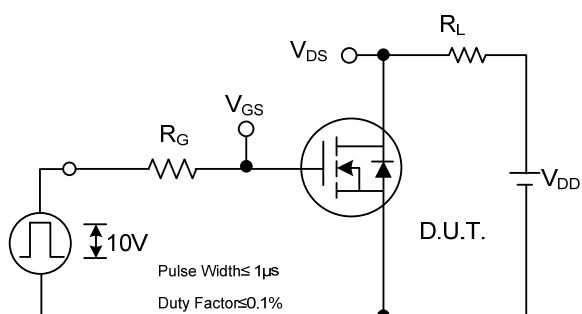


Peak Diode Recovery dv/dt Test Circuit

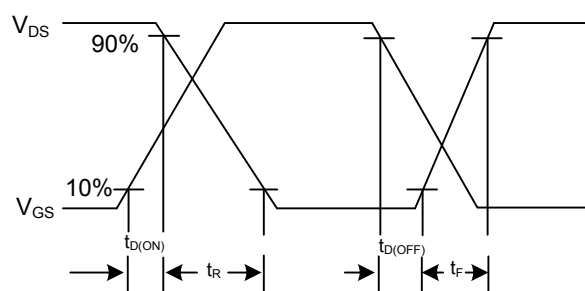


Peak Diode Recovery dv/dt Waveforms

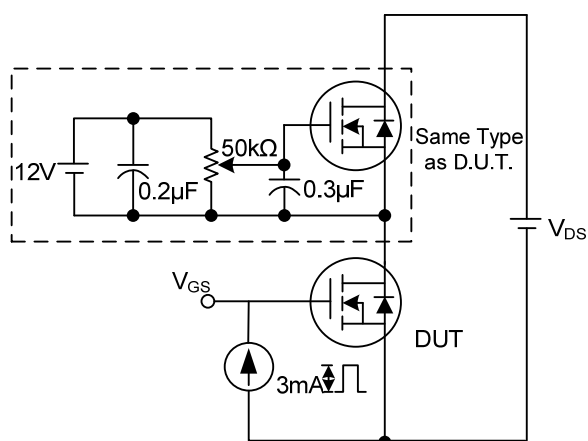
■ TEST CIRCUITS AND WAVEFORMS (Cont.)



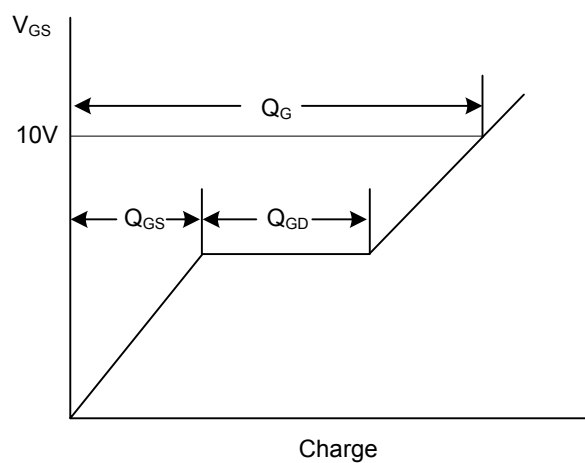
Switching Test Circuit



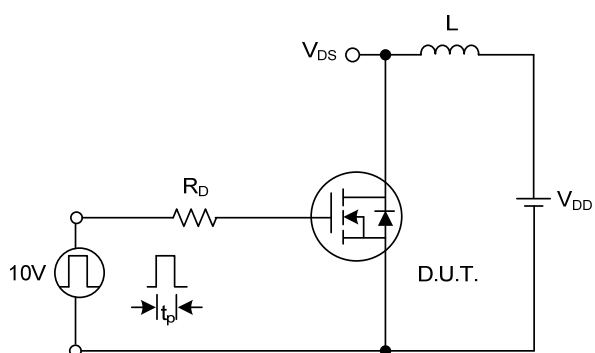
Switching Waveforms



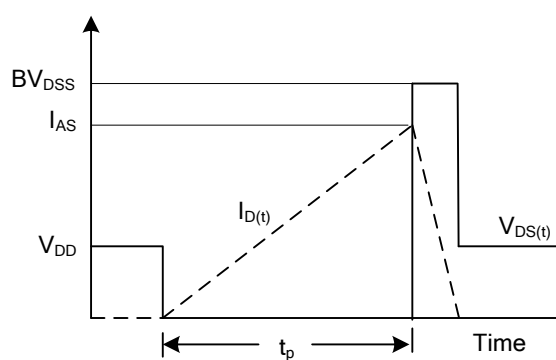
Gate Charge Test Circuit



Gate Charge Waveform



Unclamped Inductive Switching Test Circuit



Unclamped Inductive Switching Waveforms

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